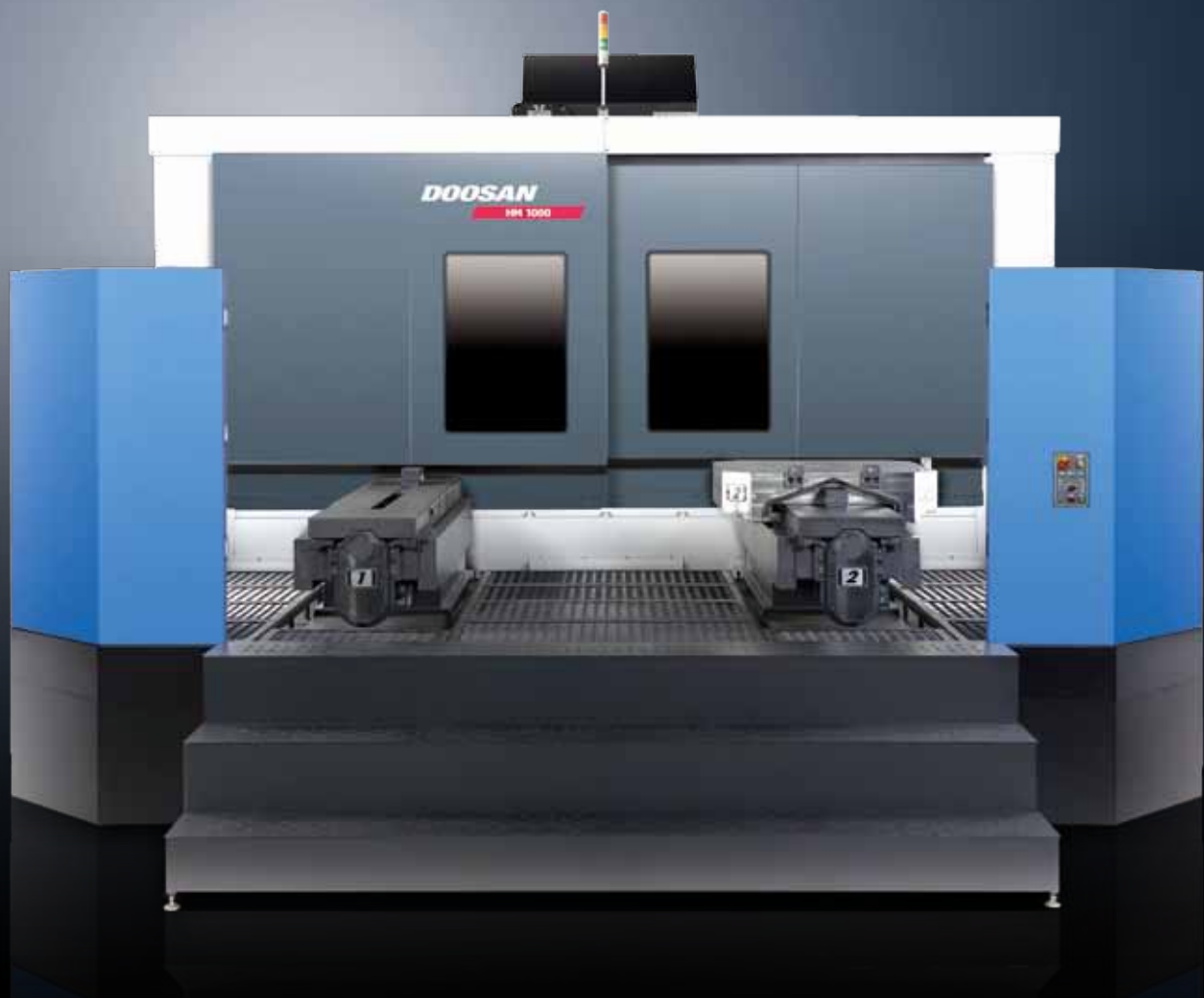




HM 1000/1250

The Largest Horizontal Maching Center



Doosan Machine Tools

Optimal Solutions for the Future

**The largest horizontal machining center in
HM 1000/1250 featuring heavy duty
and accuracy on an extremely rigid base.**

HM 1000/1250



HM 1000/1250 combines a high torque spindle drive and powerful axis drives for a large chip removal rate. The massive meehanite cast structure and wrap around box ways provide the rigidity required for both heavy cutting and superb surface finishes.

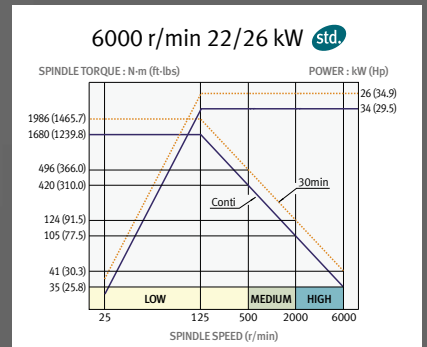
The machine is exceptionally stable and maintains excellent positioning accuracy and repeatability in any environment.



High Speed Spindle Powerful Spindle

The 3 speed spindle head combines high speed and high torque for a wide range of cutting applications. The standard 6000 r/min spindle has 1989.4 N·m of low end torque. The spindle features two double row cylindrical roller and an angular thrust bearing. The bearings are assembled using a stepped sleeve system which allows precise adjustment and eliminates the possibility of assembly damage associated with lock nut system.

Spindle power-torque diagram



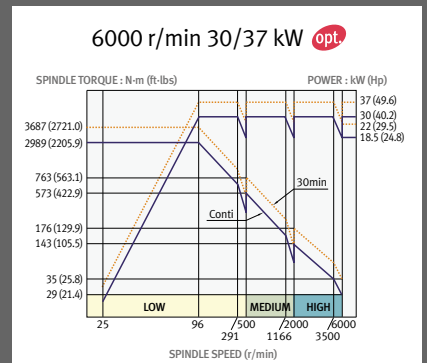
Max. spindle speed
6000 r/min

Motor (30 min)

26 kW
(34.9 Hp)

37 kW opt.
(49.6 Hp)

Spindle power-torque diagram

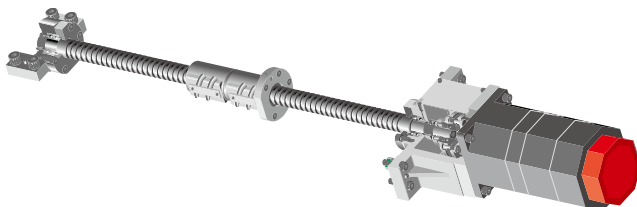


Spindle head cooling system



The refrigerated cooling system maintains a uniform spindle temperature required for high accuracy and extended production. Thermo sensors regulate the temperature of the oil which is circulated through oil jackets around the spindle, as well as the drive shaft bearings, gears, and motor flanges.

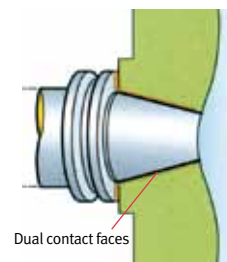
Ball Screws & Axis Drives



High torque Fanuc servo motors are mounted directly to the balls screws to eliminate servo lag or error. Each ball screw is fully protected by rigid coupling. These couplings prevent damage in the event of a sudden impact with the work piece or table and can be easily reset.

Dual contact system (Big plus) std.

The dual contact system offers simultaneous dual contact between the machine spindle face and toolholder flange face, as well as the machine spindle taper and long toolholder taper shank. This system is based on the most currently available standards for BT, DIN and CAT flange tooling.



- Higher rigidity
- Improved ATC repeatability, surface finish and higher precision machine
- Extended tool life

Tool Magazine

Automatic tool changer

Tool change time (T-T-T)

10 s



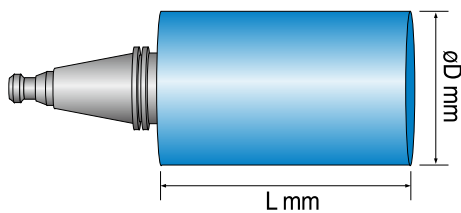
Tool storage capacity

60 tools (Opt : 90/120/196)

The automatic tool changer is completely separate from the machine body, eliminating any adverse effects on machining. The tool changer is external to the cutting area and is fully protected from chip and coolant. Heavy 25kg tools up to 650mm long and 300mm diameter can be effortlessly accommodated. The fixed address design automatically returns tools back to their original magazine position and reduce the collision when oversize tooling is used. Manual loading of the bidirectional magazine is facilitated by a convenient foot switch which releases the tool. Tools in the magazine can be safely changed during machine operation.



Maximum tool size



Max. tool diameter

Ø130 mm (Continuous)
(5.1 inch)

Ø300 mm (Adjacent ports are empty)
(11.8 inch)

Max. tool length

650 mm
(25.6 inch)

Max. tool weight

30 kg
(66.1 lb)

Automatic Pallet Changer

The standard two station parallel shuttle automatic pallet changer is positioned by ball screw and induction motor. Adjustable speed by inverter allows heavy work pieces to be exchanged stably. The pallet is positioned by four taper cones. An air cleaning system eliminates any contamination from chips or dust, and guarantees high positioning accuracy. 15400kg of clamping force assures stability during heavy cutting.



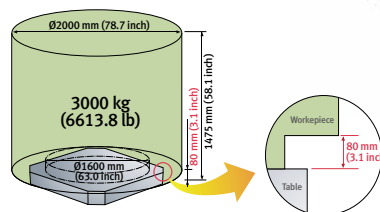
Pallet index degree

1°

Pallet index time (90°)

4.2 s (HM1000)

Max. Workpiece Size.



	HM 1000	HM 1250
Pallet size (mm / inch)	1000×1000 (1250×1000)* (39.4×39.4) (49.2×39.4)*	1000×1000 (1250×1000)* (39.4×39.4) (49.2×39.4)*
Max.workpiece size (mm/ inch)	Ø2000×H 1475 (78.7×58.1)	Ø2000×H 1725 (78.7×67.9)
Max.workpiece weight (kg / lb)	3000 (6613.8)	
APC stroke (mm/ inch)	2100 (82.7)	2500 (98.4)

*:Z-axial direction stroke is limited on Pallet 1250 x 1000 (50 mm) (49.2 x 39.4 (2.0 inch)) and 1250 x 1250 (100 mm) (49.2 x 49.2 (3.9 inch)) dependent upon B-axis rotation position at 50 mm/100mm (2.0 inch / 3.9 inch) respectively.

Rigid Structure Bed and Column



Travel axes (X/Y/Z)

2100/1250/1250 mm (HM 1000)
(82.7 / 49.2 / 49.2 inch)

2100/1500/1500 mm (HM 1250)
(82.7 / 59.1 / 59.1 inch)

The heavy cast iron construction provides the rigidity needed for the most demanding cutting conditions. Every component has been designed to prevent deformation. High quality meehanite castings provide excellent dampening characteristics. HM 1000/1250 have solid box ways which are induction hardened and ground. A fluorplastic resin is bonded to the mating surfaces and then hand scraped to insure perfect fit. This superior process provides a low friction coefficient for excellent repeatability and fast rapid traverse rates as well as a full contact bearing surface for unsurpassed rigidity. The large diameter ball screws are preloaded on both ends for accurate and responsive positioning.

Guideways and Axis Drives



Box guideways provide higher dampening property with best technology for heavy duty applications.



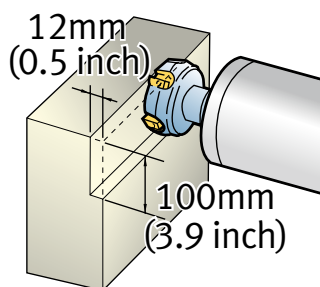
All guideways are wide box type for unsurpassed long-term rigidity and accuracy. The guideways are induction hardened and precision ground. Fluroplastic resin is boned to the mating surfaces and then hand scraped to ensure perfect fit and tolerances. The fluroplastic resin with the forced way lubrication combine to provide a low friction surface and virtually eliminates guide wear. All guideways are fully protected from chips and damage.

Rapid traverse **24 m/min (944.9 ipm)**

Cutting Performance

Face mill Carbon steel (SM45C)

Ø125 Face mill (8Z)



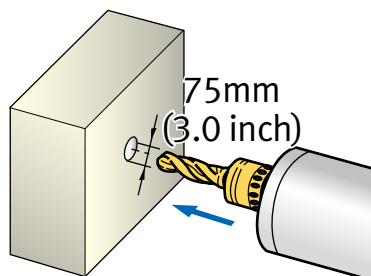
Machining rate **1200 cm³/min**
(73.2 inch³/min)

Spindle speed 308 r/min

Feedrate 1000 mm/min
(39.4 ipm/min)

Drill Gray casting (GC250)

Ø75 Drill (2Z)

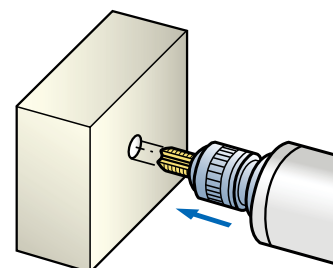


Machining rate **318 cm³/min**
(19.4 inch³/min)

Spindle speed 137 r/min

Feedrate 72 mm/min
(2.8 ipm/min)

Tap Carbon steel (SM45C)



Machining rate **M56×P5.5**

Spindle speed 120 r/min

Feedrate 660 mm/min
(26.0 ipm/min)

Optional Equipment



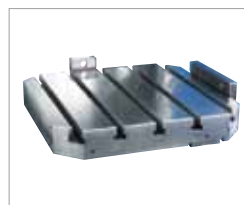
90/120 Tools



Matrix Magazine (196 Tools)



Chip conveyor / Bucket



T-slot pallet



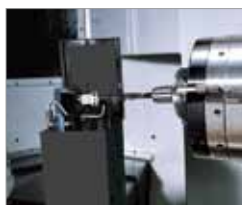
Built-in rotary table (0.001°)



Shower coolant



Through the spindle coolant system



Automatic tool length
measurement with sensor



Automatic measuring system



Linear scale feedback system



Oil mist collector



Semi-dry unit



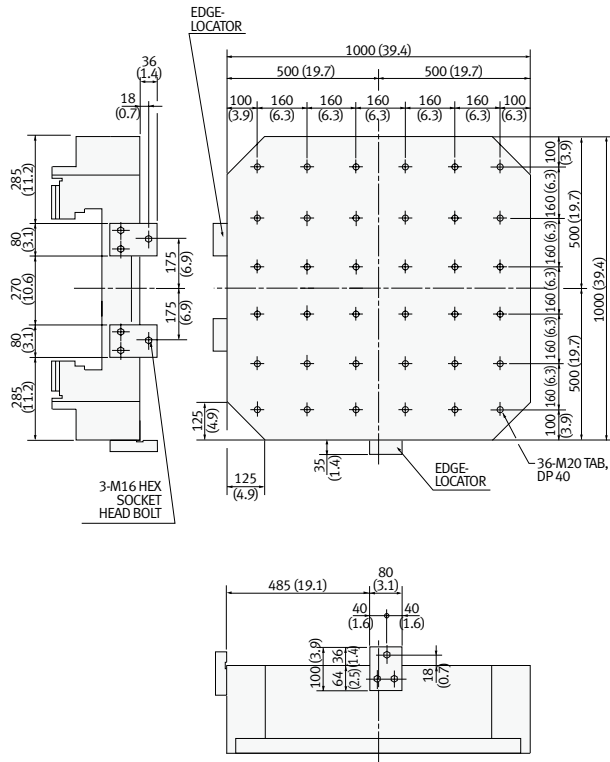
Coolant gun

- Automatic power on
- Automatic power off
- Multi-pallet magazine (6 stations)*
- Oil skimmer
- Test bar
- Test bar
- Cool monitoring system

Marked by * should be reviewed in detail before contract.

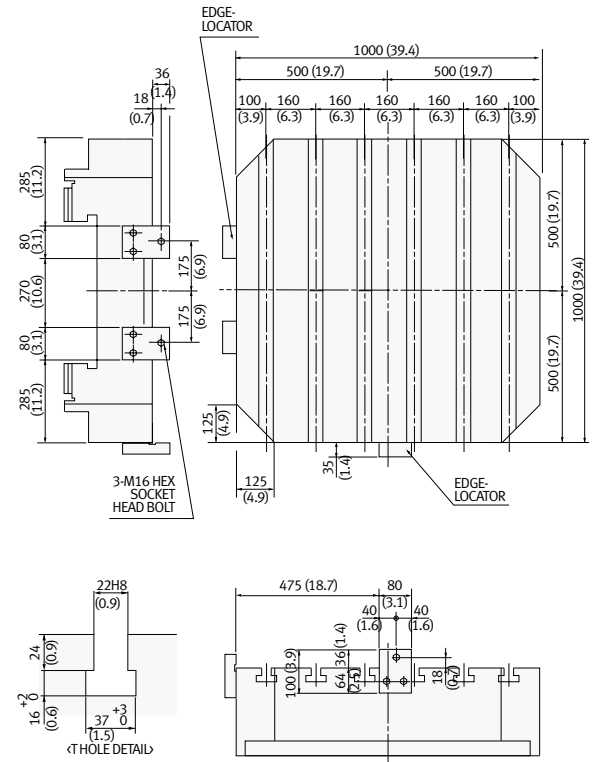
Pallet Dimensions

Tap Pallet std.



T - slot pallet opt.

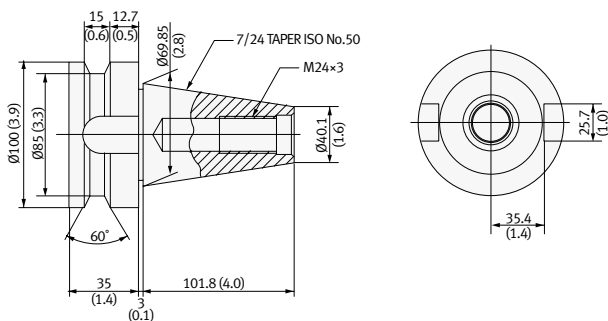
Unit : mm (inch)



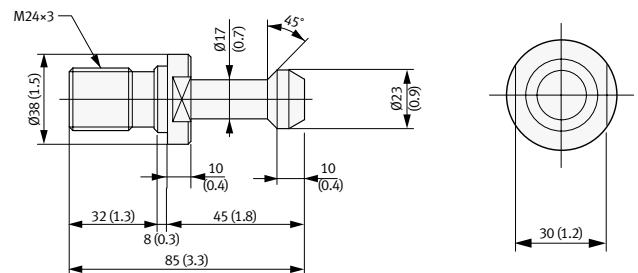
Tool Shank

Unit : mm (inch)

BT50 std.



Pull - stud (MAS 403 - P50T - I)



Machine Specifications

Description			Unit	HM 1000	HM 1250	
Travels	Y-axis	X-axis	mm (inch)	2100 (82.7)		
		Y-axis	mm (inch)	1250 (49.2)		1500 (59.1)
		Z-axis	mm (inch)	1250 (49.2)		1500 (59.1)
	Distance from spindle center to pallet top		mm (inch)	75 ~ 1325 (3.0 ~ 52.2)	75 ~ 1575 (3.0 ~ 62.0)	50 ~ 1550 (2.0 ~ 61.0)
	Distance from spindle nose to table center		mm (inch)	250 ~ 1500 (300 ~ 1500)* (9.8 ~ 59.1 (11.8 ~ 9.1)*)	285 ~ 1785 (335 ~ 1785)* (11.2 ~ 70.3 (13.2 ~ 70.3)*)	285 ~ 1785 (385 ~ 1785)* (11.2 ~ 70.3 (15.2 ~ 70.3)*)
Table	Pallet size		mm (inch)	1000 × 1000 (1250 × 1000)* (39.4 × 39.4 (49.2 × 39.4)*)	1000 × 1000 (1250 × 1000)* (39.4 × 39.4 (49.2 × 39.4)*)	1250 × 1250 (49.2 × 49.2)
	Pallet loading capacity		kg (lb)	3000 (6613.8)		
	Pallet surface			36 - M20 × P2.5 (44 - M20 × P2.5)*	36 - M20 × P2.5 (44 - M20 × P2.5)*	60 - M20 × P2.5
	Pallet index degree		deg	1° {0.001°}		
Spindle	Max. spindle speed		r/min	6000		
	Spindle taper			ISO #50 7/24 Taper		
	Max. spindle torque		N·m (ft·lbs)	1989.4 {3687} (1468.2 {2721.0})		
Feedrate	Rapid traverse rate (X/Y/Z)		m/min (ipm)	24 (944.9)		
	Cutting feedrate		mm/min (ipm)	12000 (472.4)		
Automatic tool changer	Type of tool shank			MAS403 BT50		
	Tool storage capacity		ea	60 {90/120/196}		
	Max. tool diameter		mm (inch)	130 (5.1)		
	Max. tool diameter without adjacent tools		mm (inch)	300 (11.8)		
	Max. tool length		mm (inch)	650 (25.6)		
	Max. tool weight		kg (lb)	30 (66.1)		
	Method of tool selection			Fixed address		
	Tool change time (Tool-To-Tool)		s	10		
	Tool change time (Chip-To-Chip)		s	15		
Automatic pallet changer	Number of pallet		ea	2 {6}		
	Type			Parallel shuttle		
	Pallet change time		s	75	85	
Motor	Spindle motor (30min)		kW (Hp)	26 {37} (34.9 {49.6})		
	Feed motor (X/Y/Z)			6.0 / 6.0 / 6.0 / 4.0 (8.0 / 8.0 / 8.0 / 5.4)		
Power source	Electric power supply (Rated capacity)		kVA	70		
	Compressed air supply MPa 0.54		MPa	0.54		
Tank capacity	Coolant tank capacity		L (gal)	1000 (264.2)		
	Lubrication tank capacity		L (gal)	4.3 (1.1)		
Machine Dimensions	Machine height		mm (inch)	3815 (150.2)		4065 (160.0)
	Machine dimensions (L x W)		mm (inch)	5822 × 9657 (229.2 × 380.2)		5822 × 10530 (229.2 × 3414.6)
	Machine weight		kg (lb)	29000 (63933.1)		31000 (68342.3)

Distance from spindle nose to table center during the pallet B-axis indexing.

If you choose pallet size 1250 x 1000mm (49.2 x 39.4 inch), the stroke of z axis is adjusted 1200mm (49.2 inch).

{ } : Option

Standard Feature

- Assembly & Operation tools
- Coolant tank & Flood coolant
- Door interlock for safety
- Full enclosure splash guard
- Installation parts
- Oil cooler & spindle cooling system
- Operator call lamp (Red, Yellow, Green)
- Portable MPG
- Work light

* Design and specifications are subject to change without notice.

* We do not responsible for difference between the information in the catalogue and the actual machine.

NC Unit Specifications

Fanuc 31i

AXES CONTROL

- Controlled axes	4 (X,Y,Z,B)
- Simultaneous controlled axes	4 axes
	Positioning (G00) / Linear interpolation (G01) : 3 axes
	Circular interpolation (G02, G03) : 2 axes
- Backlash compensation	
- Emergency stop / overtravel	
- Follow up	
- Least command increment	0.001mm / 0.0001"
- Least input increment	0.001mm / 0.0001"
- Machine lock	all axes / Z axis
- Mirror image	Reverse axis movement
	(setting screen and M - function)
- Stored pitch error compensation	Pitch error offset compensation for each axis
- Stored stroke check 1	Overtravel controlled by software

INTERPOLATION & FEED FUNCTION

- Positioning	G00
- Linear interpolation	G01
- Circular interpolation	G02, G03
- Dwell	G04
- Exact stop check	G09, G61 (mode)
- Skip function	G31
- Reference point return check	G27
- Reference point return	G28
- 2nd reference point return	G30
- 3rd / 4th reference return	
- Rapid traverse override	F0 (fine feed), 25 / 50 / 100 %
- Feed per minute	mm / min
- Feedrate override (10% increments)	0 - 200 %
- Jog override (10% increments)	0 - 200 %
- Override cancel	M48 / M49
- Manual handle feed (1 unit)	
- Manual handle feedrate	0.1 / 0.01 / 0.001 mm
- Automatic acc./dec.	
- Helical interpolation	
- AI Contour Control II	200 block preview
- Machine condition selection function	
- Thread cutting, synchronous cutting	
- Program restart	
- Automatic corner deceleration (Specify AI Contour control II)	
- Feedrate clamp by circular acceleration	
- Linear ACC / DEC before interpolation (Specify AI Contour control II)	
- Linear ACC / DEC after interpolation	
- Control axis detach	
- Rapid traverse bell-shaped acceleration/deceleration	
- Smooth backlash compensation	
- Interpolation type pitch error compensation	

SPINDLE & M-CODE FUNCTION

- M- code function	M 3 digits
- Spindle orientation	
- Spindle serial output	
- Spindle speed command	S5 digits
- Spindle speed override (10% increments)	10 - 150%
- Spindle output switching	
- Retraction for rigid tapping	
- Rigid tapping	G84, G74

TOOL FUNCTION

- Tool nose radius compensation	G40, G41, G42
- Number of tool offsets	200 ea
- Tool length compensation	G43, G44, G49
- Tool number command	T3 digits
- Tool life management	
- Tool offset memory C	H/D code, Geometry / Wear memory
- Tool length measurement	

PROGRAMMING & EDITING FUNCTION

- Absolute / Incremental programmin	G90 / G91
- Auto. Coordinate system setting	
- Background editing	
- Canned cycle	G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius programming	
- Plane selection	G17, G18, G19
- Custom macro B	
- Custom software size	512kb
- Extended P-code Variables size	512kb
- Addition of custom macro common variables	#100 - #199, #500 - #999
- Decimal point input	
- Reader / puncher interface	RS - 232C
- Inch / metric conversion	G20 / G21
- Label skip	
- Local / Machine coordinate system	G52 / G53
- Maximum commandable value	± 99999.999 (± 9999.9999 inch) mm
- Part program storage size	(640m) 256 kb

- No. of Registered programs	500 ea
- Optional block skip 1	
- Optional stop	M01
- Program file name	32 characters
- Sequence number	N 8-digit
- Program protect	
- Program stop / end	M00 / M02, M30
- Programmable data input	

Tool offset and work offset are entered by G10, G11

- Sub program call	Up to 10 nesting
- Tape code	ISO / EIA Automatic discrimination
- Work coordinate system	G54 - G59
- Additional work coordinate system (48 Pairs)	G54.1 P1 - 48 pairs
- Coordinate system rotation	G68, G69
- Extended part program editing	
- Optional chamfering corner R	
- Macro executor	

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

- Alarm display	
- Alarm history display	
- Actual cutting speed display	
- Clock function	
- Cycle start / Feed hold (Cycle stop)	
- Display of PMC alarm message.	Message display when PMC alarm occurred.
- Dry run	
- Single block	
- Ethernet function (Embedded)	
- Graphic display	Tool path drawing
- Help function	
- Loadmeter display	
- DISPLAY / MDI unit	10.4" color LCD / Keyboard for data input, soft-keys
- Memory card interface	
- Operation functions	Tape / Memory / MDI / Manual
- Operation history display	
- DNC operation with memory card	
- Program restart	
- Run hour and part number display	
- Search function	Sequence NO. / Program NO.
- Self - diagnostic function	
- Servo setting screen	
- External data input	
- Multi language display	

OPTIONAL SPECIFICATIONS

- 3-dimensional coordinate conversion	
- 3-dimensional tool compensation	
- Addition of tool pairs for tool life management	1024 pairs
- Additional controlled axes	Max. 6 axes in total (Simultaneously 4 axes)
- Additional work coordinate system	G54.1 P1 - 300 (300 pairs)
- AI Contour Control II	600 block preview
	1000 block preview
- Automatic corner override	G62
- Chopping function	G81.1
- Cylindrical interpolation	G07.1
- Data server	
- Dynamic graphic display	Machining profile drawing
	When the EZ Guide i is used, the Dynamic graphic display cannot application
- EZ-GUIDE i (Doosan Infracore Conversational Programming Solution)	
- Tape format for FS 15	
- Increment system 1/10	
- Figure copying	G72.1, G72.2
- Manual handle feed 2/3 unit	
- Handle interruption	
- High speed skip function	
- Involute interpolation	G02.2, G03.2
- Coinical / spiral interpolation	
- Machining time stamp function	
- No. of Registered programs	1000 ea
- Number of tool offsets	400 / 499 / 999 / 2000 ea
- Optional block skip addition	2~9 blocks
- Part program storage	512KB (1280m)
	1MB (2560m) / 2MB (5120m) / 8MB (20480m)
- Playback function	
- Polar coordinate command	G15 / G16
- Polar coordinate interpolation	G12.1 / G13.1
- Programmable mirror image	G50.1 / G51.1
- Scaling	G50, G51
- Single direction positioning	G60
- Stored stroke check 2/3	
- Tool offset	G45 - G48
- Position switch	
- Tool center point control	G43.4
- Rotary table dynamic fixture offset	

* Prior consultation is required.



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Optimal Solutions for the Future

EN 1312SU

- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan.

